

## **REMARKS**

Claims 1-14 were examined and rejected. Applicants amend claims 1, cancel claim 10, and submit additional claims 15-21. Applicants assert that no new matter is added herein. Applicants respectfully request reconsideration of claims 1-9 and 11-14, and consideration of additional claims 15-21 in view of at least the following remarks.

### **I. Claims Rejected Under 35 U.S.C. § 103**

The Patent Office rejects claims 1-14 under 35 U.S.C. § 103 as being unpatentable over 5,120,925 to Onishi et al. (Onishi), in view of 4,908,226 to Kubena et al. (Kubena), 5,182,231 to Hongo et al. (Hongo), and 5,132,248 to Drummond et al. (Drummond). To render a claim obvious, all elements of the claim must be taught or suggested by at least one properly combined reference of the combination.

Applicants respectfully disagree with the rejection above and submit that independent claim 1, as amended, is patentable over the cited references for at least the reason that the cited references do not teach or suggest a system having a controller configured to control the introduction of a focused ion beam to form at least one metal layer over a substrate, and instructions for controlling a coherent electromagnetic radiation source applied to a top surface of the at least one layer to heat the at least one metal layer sufficiently to remove gallium from the layer, as required by amended claim 1.

The Patent Office cites Hongo to teach removing carbon and oxygen as impurities. (See Hongo, col. 11, lines 43-47) However, the Patent Office has not cited Applicants are unable to find any description or suggestion in Hongo that accounts for heating the layer sufficiently to remove gallium from the layer, as required by amended claim 1.

In addition, Drummond describes a process for forming metal or dielectric depositions to form layers on a substrate. (See Drummond, col. 4, lines 13-20, and col. 6, lines 63-68). To do so, Drummond teaches depositing materials by an inkjet printing

technique that writes material formulated as colloidal suspension directly onto a substrate surface, such as a via piezoelectric driven jet system. (See Drummond, col. 3, lines 56-67) However, the Patent Office has not identified and Applicants are unable to find any teaching or suggestion in Drummond that accounts for heating a layer sufficiently to remove gallium from the layer, as required by amended claim 1.

Also, Kubena discloses heating element 28 around which electrical heating wire 30 is coiled to heat substrate 32 which is placed on top of heating element 28. (See Kubena, col. 4, lines 29-43) However, the Patent Office has not identified and Applicants are unable to find any description or suggestion in Kubena that accounts for controlling a coherent electromagnetic radiation source applied to a top surface of at least one layer to heat the at least one layer sufficiently to remove gallium from the layer, as required by amended claim 1.

Next, as noted by the Patent Office, Onishi fails to teach a coherent electromagnetic radiation source to heat a metal layer.

Hence, for at least the first reason that neither Onishi, Kubena, Drummond, Hongo, nor the combination teach the limitation noted above of amended claim 1, Applicants respectfully request that the Patent Office withdraw the rejection above of claim 1.

Second, Applicants assert that Drummond cannot be properly combined with Onishi. Onishi teaches using focused ion beam technology to provide etching, transplantation, and repair of electronic devices already existing on a substrate (see Abstract). On the other hand, Drummond teaches a low power laser to adhere a colloidal suspension applied by inkjet printing (see col. 5, lines 10-58). More particularly, Drummond teaches a colloidal content of a suspension between one and twenty percent by weight, keeping an ambient temperature around the substrate below 150°C and annealing the colloidal deposition using a low power laser to homogenize and resolve the desired pattern, and to provide adhesion without localizing melting of the substrate or excessive volatilization of the colloidal material. (See Drummond, col. 5, lines 10-58) Specifically, Drummond teaches that the step of keeping the ambient

temperature below 150°C may provide the drying step and annealing step simultaneously. (See Drummond, col. 5, lines 21-24; and claim 14) Thus, Applicants do not believe that either reference provides a motive for combining a low power laser to adhere a colloidal suspension applied by an inkjet printing system with a focused ion beam technology for providing etching, transplanted, and repair of electronic devices already existing on a substrate. In fact, Applicants are not sure that the low power laser annealing to adhere the colloidal material of Drummond would have any benefit or affect on the focused ion beam deposited metal of Onishi. Next, Applicants note that there does not appear to be a proper motive for combining the low power laser to homogenize and resolve a pattern of inkjet printing of Drummond and the electrical heating wire of Kubena or the use of a laser during chemical vapor deposition of Hongo. For instance, heating the media printed on in Drummond (e.g., colloidal suspension) using the heating wire of Kubena or laser power cited in Hongo may damage the low power anneal requiring media of Drummond (e.g., colloidal suspension). Similarly, the lasers of Drummond and Hongo are not germane and provide no additional benefit as compared to the heating wire heating the entire substrate of Kubena. Correspondingly, the low power laser to adhere a colloidal suspension applied by inkjet printing of Drummond provides no benefit to the use of a laser as taught by Hongo. Therefore, Applicants can only conclude that the motive to combine the references includes knowledge gleaned only from Applicants' disclosure. Hence, Applicants assert that the combination of Onishi with Drummond is the result of impermissible hindsight, in accordance with MPEP § 21.45.X.A. Thus, Applicants respectfully request that the Patent Office withdraw the above rejection of claim 1, for at least this second reason.

Moreover, Applicants traverse the Patent Office's assertion that "annealing in the art of ion beam processing is well known by using either CVD substrate support as taught by Kubena et al. or by using laser beam as taught by Hongo et al. Further, incorporating the laser annealing unit and the associated computer controlling programs into the computer of the ion beam apparatus of Onishi et al. is considered to have been obvious to one of ordinary skill in the art at the time of the invention so that the entire operation of the apparatus is controlled through a central computer," in

accordance with MPEP § 2144.03 and request that the Patent Office cite a reference in support of that position. Specifically, the Patent Office's citation of references mentioning a computer for disparate technologies does not support that a practitioner in the art would find it obvious to select specific computer instructions from the disparate technologies (the existence of which Applicants do not agree even exist) and somehow create a computer-readable program that is capable of combining those instructions in an enabled manner to teach Applicants' claims. For example, Applicants assert that there is not a reasonable expectation of success in combining computer instructions applicable to controlling the ion beams of Kubena and Onishi and computer instructions for controlling the lasers of Hongo and Drummond together in one program since each of the beams and lasers is controlled as being incident at an angle of 90 degrees or perpendicular to the surface of the substrate (for example, see Hongo, col. 5, lines 21-22). Since there is no teaching cited of an ion beam and a laser in a single device perpendicular to the surface of the substrate, either the ion beam or the laser must be disposed other than perpendicular to the surface of the substrate. However, there is no reasonable expectation of success of a combined computer instructions of the cited references to control either an ion beam or laser that is not perpendicular to the surface of the substrate (e.g., off axis) because the references do not teach or suggest such an orientation. (See MPEP § 2143.02)

Applicants submit that dependent claims 2-9 and 11-14 being dependent upon allowable base claim 1, as amended, are patentable over the cited references for at least the reasons explained above. Thus, Applicants respectfully request that the Patent Office withdraw the rejection of dependent claims 2-9 and 11-14 as being unpatentable over the cited references.

## **II. Additional Claims 15-21**

Applicants note that additional claim 15 is supported at page 5, paragraph 5, and heat source 191 of Figure 1 of the specification as originally filed. Also, additional claim 18 is supported at page 5, paragraph 3 and heat source 191 of Figure 1 of the specification as originally filed.

Applicants assert that additional independent claim 15 is patentable over the cited references because the cited references do not teach or suggest "instructions for controlling one of a continuous wave layer and a pulsed laser applied to a top surface of the at least one layer at an angle of less than 90 degrees," as required by independent claim 15.

Applicants submit that additional claims 16-17 being dependent upon allowable base claim 15 are patentable over the cited references for at least the reason explained above.

In addition, Applicants assert that additional claim 18 is patentable over the cited references because the cited references do not teach or suggest "instructions for controlling a coherent electromagnetic radiation source applied to a top surface of the at least one layer at an angle of less than 90 degrees to heat the at least one layer; and a lens coupled to the coherent electromagnetic radiation source to focus the coherent electromagnetic radiation source to a spot size on the at least one layer that conforms to the line width of the at least one layer," as required by additional claim 18.

Applicants submit that dependent claims 19-21 being dependent upon allowable base claim 18 are patentable over the cited references for at least the reasons explained above.

### **III. Double Patenting**

The Patent Office provisionally rejects claims 1-14 under the judicially created Doctrine of Obvious-Type Double Patenting as being unpatentable over claims 1-6 of co-pending application no. 10/209,453. Applicants thank the Patent Office for pointing out the provisional rejection and defer response to the provisional double patenting rejection until a time the provisional rejection becomes non-provisional

### CONCLUSION

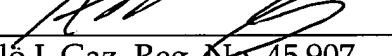
In view of the foregoing, it is believed that all claims now pending (1) are in proper form, (2) are neither obvious nor anticipated by the relied upon art of record, and (3) are in condition for allowance. A Notice of Allowance is earnestly solicited at the earliest possible date. If the Examiner believes that a telephone conference would be useful in moving the application forward to allowance, the Examiner is encouraged to contact the undersigned at (310) 207-3800.

If necessary, the Commissioner is hereby authorized in this, concurrent and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2666 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17, particularly, extension of time fees.

Respectfully submitted,

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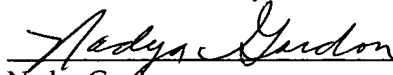
Dated: January 10, 2005

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### CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service as First Class Mail with sufficient postage in an envelope addressed to: Mail Stop AF, Commissioner for Patents, P. O. Box 1450, Alexandria, Virginia 22313-1450 on January 10, 2005.

 1/10/05  
Nadya Gordon Date